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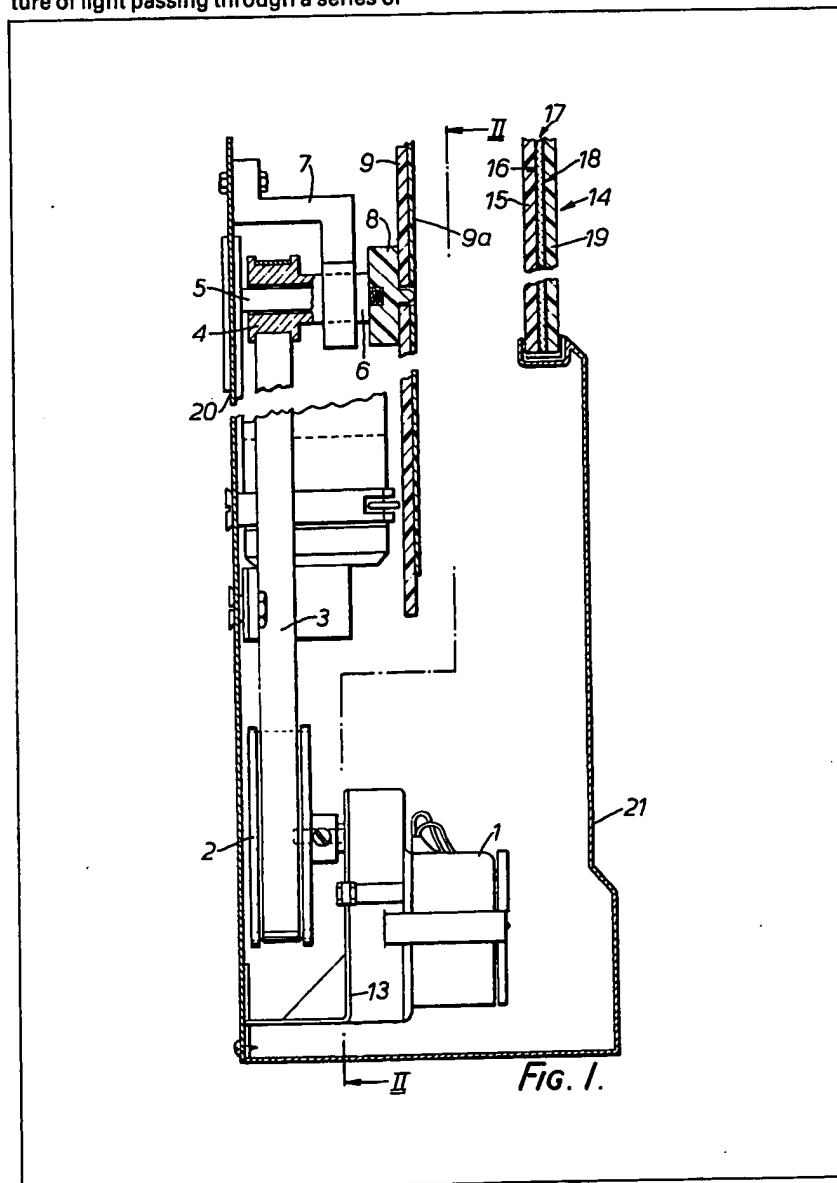
(54) Colour displays

(57) A luminous system of chromatic dynamics is developed for producing iridescent ornamental effects and commercial effects such as for advertising billboards, providing same with iridescent effects of great impact through the application of light as the only source of colour.

This system of chromatic dynamics is constituted by an optic or additive mixture of light passing through a series of

optically active (birefringent) transparent media where colour results from the characteristics, thickness and molecular arrangement of the sheets used. The phase differences produced among the emergent waves depend on the difference of the indices, the thickness of the sheets and their optical properties in relation with the molecular structure in the transparent media,

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thereby obtaining images of brilliant colouring.

The images produced on the luminous effect screen 14 may be derived from fluorescent tubes (10 or 11), overlapping diffusion discs (polariser) 9 (or 6) belt driven from one or more motors 1, a sheet 15 of clear methacrylate, a sheet 16 of frosted or flat acetate, one or more birefringent sheets 17, a scanning sheet 18 and a sheet 19 of frosted anti-reflective methacrylate.

SPECIFICATION

A luminous system of chromatic dynamics

5 The object of this invention is related to the creation of a luminous system of chromatic dynamics, developed especially for producing ornamental iridescent effects of high quality, and even commercial effects with, for example, large outdoor advertising
10 billboards, which are provided with iridescent effects of great impact through the application of light as the only color source.

Commencing from this basis, according to precedent studies color is possible thanks to the nature
15 and reciprocity of three elements: 1) light as electromagnetic radiation within certain frequencies, from 4,000 to 7,000 millimicrons; 2) matter as concretion of energy and its reaction to color, and 3) the eye which perceives and analyzes color.

20 Matter, or objects in themselves, are nothing but mere reflectors, the means which absorb and transmit one or more of the frequencies which comprise the light beam. The mixture of prismatic colors thus considered as a sum of lights follows some laws
25 different from those which govern the mixture of coloring and pigmentary bodies, and thus rarely can experiences obtained by mixing the different types of pigments be applied to the additive mixture of the color contained in the light beam.

30 The reason is not difficult to understand if it is kept in mind that the two phenomena are fundamentally different: light is the source of all color, while pigments do nothing more than reflect, absorb and transmit colors; that is, a selective transmission of
35 the light, since sunlight is a "white" light containing all the colors of the spectrum, the color white thus being the simultaneous and balanced perception of all the radiations visible. When no sensation of light is perceived, that is, when there is an absence of
40 light, the sensation of obscurity is produced which we identify with black.

Any intermediate visual sensation between the cited two extremes will be equivalent to perception of the different colors which are the sensations
45 produced by the multiple combinations possible between the waves of the visible spectrum.

Thus, what generally is perceived as color is the part of the light spectrum reflected by an object and not absorbed by its surface. We observe objects by
50 means of the light they reflect, and thus it is not strictly correct to attribute color to an object, but to the light reflected by it. The color of the reflected light depends on the color of the incident light, and on the particular way in which the color changes in
55 the process of reflection. The reflection factor, or the fraction of incident light which is reflected, results according to the wavelength, and it is said that selective reflection exists.

On the basis of these principles, the present
60 system is aimed at developing a novel medium of expression or luminous panel of CHROMATIC DYNAMICS (DICHROMATISM), constituted by an optic or additive mixture of light upon traversing a series of optically active (birefringent) transparent
65 media where color results from the characteristics,

thickness and molecular arrangement of the sheets used. The phase differences produced among the emergent waves depend on the difference of the indices, the thickness of the sheets and their optical
70 properties in relation with the molecular structure in the transparent media.

The images obtained with this system are of brilliant coloring, these colors being the result of the sum of the three basic additive colors: red, green
75 and blue, called light additives because all together they produce the color white. The sum or mixture of wavelengths of two primary light additive colors forms the secondary colors. For example: red plus green is equal to yellow, these resulting colors
80 always being more clear than any of their components. The mixture opposite the light additive is the subtractive, with material or pigmentary colors bonded by a liquid. When mixed, the three subtractive primary colors form the color black through the
85 effect of the rest of their light radiations, and the mixed color obtained is always darker than any of the components.

This new medium offers the possibility of a great variety, brilliance and purity of coloring (clear colors), eliminating the complication and blurring of the pigments comprising the substances traditionally
90 used until now. In addition, the colors and even the forms of the chromatic dynamics luminous panel can change in periodic sequences, the effect appearing in at least two different and complementary
95 aspects and generally with good chromatic harmony in each sequence. The result is a mobile and dynamic panel continually changing in tone, and also ideal for color studies.

100 In effect, in the system one or more diffusion discs are placed in front of some light sources, said discs being provided with a scanning sheet through which illumination is made of a luminous screen or panel containing the artistic or advertising effect, and
105 comprising one or more birefringent sheets placed between a sheet of frosted or flat acetate and a scanning sheet, adequately protected, so that the colors and even the forms represented in the chromatic dynamics luminous effect can change in
110 periodic sequences. This arrangement, perfectly suited to screens of a certain size, is not adaptable to large-size screens, and thus for these provision is made, using the same materials, elements and basic
115 system, of an arrangement of several suitably overlapped discs to cover the entire surface of a large screen, the discs being driven by one or more motors, in this case preferably synchronized, with which the same effects are achieved as are obtained with modules of smaller size, but over larger surface
120 areas.

With this system, color appears as something more than an aesthetic and decorative element: it is composition, atmosphere, expression and cadence, or color in a heretofore unknown state of brilliancy.
125 Hence the most suggestive element in these panels is their color, color as an enlivening element and an element of communication.

In short, the system of this invention not only supposes true novelty as a manner of artistic
130 expression, but understandably can be totally re-

volutionary not as a substitute for means of expression already existent, but as a new medium in its own right with which it is possible to enrich the wide world of visual communication and plastic expression.

- 5 For a better understanding of the contents of this specification, two sheets of drawings are attached which illustrate an actual practical example of the object for which protection is sought, which example
10 is given and represented merely as a guide, and therefore without any manner of limitation.

In these drawings accompanying this descriptive specification:

- Figure 1* represents a profile view of a sectional
15 detail of the lower half of the light unit.

Figure 2 is a plan view of the bottom or back of the receptacle unit along the line II-II.

Figure 3 is a diagrammatic frontal view of an advertising billboard panel.

- 20 *Figure 4* corresponds to a section along the line II-II.

As is seen from close observation of Figures 1 and 2, the system of this invention comprises a receptacle formed by a back (20), joined to a properly
25 shaped frame wall (21) which serves to support the outer screen (14) or luminous panel.

- In the lower central portion of the back (20) a motor element (1), mounted on a suitable base (13), is provided with a tooth-grooved drive pulley (2)
30 coupled with the internally-toothed belt (3), which transmits movement to a central input pulley (4) provided with a shaft (6) on which a diffusion disc (polarizer) is mounted.

Said input pulley (4) is mounted on a fixed shaft or
35 rod (5) solid with the back (20), to which it is thus suitably linked, whereas its shaft (6) rests in a suitable pillow bushing (7) formed preferably by a curved jib, with the result that the frontal face of the diffusion disc (9) remains absolutely free.

- 40 An optical bushing of adequate transparency (8) is inserted between said diffusion disc (9) and the free end of the mobile shaft (6), so that when projecting the corresponding light beams no dark spot appears in the coupling of the disc (9) on the shaft (6).

45 Said diffusion disc (9) is provided with a scanning sheet (9a) suitably protected by another disc of appropriate type.

- Situated in the back (20) of the receptacle are the proper cold-light sources, such as for example
50 fluorescent tubes (10), with their corresponding reactances (11) and starters (12).

The luminous effect screen or panel (14) is comprised of a clear methacrylate (15), a sheet of frosted or flat acetate (16), one or more birefringent sheets
55 (17), a scanning sheet (18) and a frosted anti-reflective transparent methacrylate (19).

- In these conditions, once the system is electrically connected the light sources (10) are illuminated and the motor (1) starts, which latter, along with the
60 diffusion disc (9), turns at the speed necessary to obtain changing tones of light and color on the screen (14) on which the corresponding ornamental effect or design has been previously placed.

As may be seen from close observation of Figures
65 3 and 4, this invention can be applied to an

advertising billboard (1), generally of large size, mounted on appropriate legs or supports (2); in this case the billboard or panel is comprised of an adequate housing (3) provided with means for
70 access to the interior lighting and mechanical elements and covered frontally with a luminous birefringent screen or sheet (4) containing the advertising or decorative effect, constituted according to the system previously described, although depending
75 on the length of the billboard or panel some small intermediate columns (5) of transparent nature can be included.

- Generally, the panel (1) consists of modular elements each of which has one or more discs (6)
80 suitably overlapped to cover the entire display surface; constituted according to the system previously described, said discs are mounted with provision in each shaft of the corresponding pulley (7) designed to receive the necessary power from a
85 drive element (8) through a suitable coupling, such as for example a toothed belt (9), so that preferably synchronized rotary movement of all the discs (6) occurs, for which synchronization belts (10) are provided.

90 Naturally and in accordance with the system, multiple cold-light elements (11) are situated behind the discs (6).

This with an arrangement of several modules, it is possible to use a panel of large size.

- 95 Although provision is made of a certain number of discs for each module, for example two, and of a drive motor with the appropriate transmission, it is noted that a single motor may be applied for an entire panel unit, or to the contrary several duly
100 synchronized or totally independent motors.

Also, the number of discs and their arrangement can vary according to the type and form of advertising panel.

- As has been said, the luminous panel achieves
105 chromatic dynamics through the optic or additive mixture of the light produced by the light sources (10), upon traversing a series of transparent optically-active (birefringent) media combined between the diffusion disc (9) (polarizer) and the scanning effect
110 screen (14), where color is produced according to the thickness, characteristics and direction of the sheets used.

CLAIMS

- 115 1. A luminous system of chromatic dynamics, characterized in that it comprises a chamber in which an optic or additive mixture of light is produced as the latter traverses a series of optically-
120 active transparent media, discs and luminous screen or panel, where color is derived from the thickness, characteristics and molecular direction of the sheets or screens used, the phase differences among the emergent waves depending on the difference of the
125 indices, the thickness of the sheets and their optical properties in relation to the molecular structure of the transparent media.

2. A luminous system of chromatic dynamics according to the previous claim, characterized by the
130 modular arrangement of various diffusion discs with

scanning sheets suitably overlapped to cover the pre-established surface of a birefringent screen containing an artistic or advertising effect, all of said discs being activated by one or more drive means and suitable transmission, so that with the turning of the discs, traversed by the light emanating from behind them, iridescent optical or additive mixture is produced from the light striking incident to birefringent sheets.

3. A luminous system of chromatic dynamics according to the previous claims, characterized in that a series of cold-light points in the back of the chamber, traversing one or more rotary discs formed by a diffusion plate provided with a suitably protected polarizing sheet, is projected onto a luminous screen or panel containing the artistic or advertising effect comprised of one or more birefringent sheets contained between a sheet of flat acetate and a scanning sheet, the whole being placed between transparent protective sheets, so that the colors and even the forms represented in the chromatic dynamics luminous panel can change in periodic sequences.

4. A luminous system of chromatic dynamics according to the previous claims, characterized in that the diffusion disc with its polarizing sheet is rotary-driven by means of a motor and suitable transmission, so arranged that the luminous radiations from the points of light do not interfere.

5. A luminous system of chromatic dynamics according to the previous claims, characterized in that the diffusion disc or discs bearing the polarizing sheet are mounted on the drive shaft through the corresponding transmission, through a transparent optical bushing which eliminates dark spots on the

center of rotation.

6. A luminous system of chromatic dynamics according to the previous claims, characterized in that the chamber containing the unit, closed frontally by the luminous screen or panel, is suitably framed to form an adequate harmonious ornamental unit.

7. A luminous system of chromatic dynamics according to the previous claims, characterized in that with the joining of several modules a very large display screen is formed, with the synchronization of movements between all the discs of the various modules.

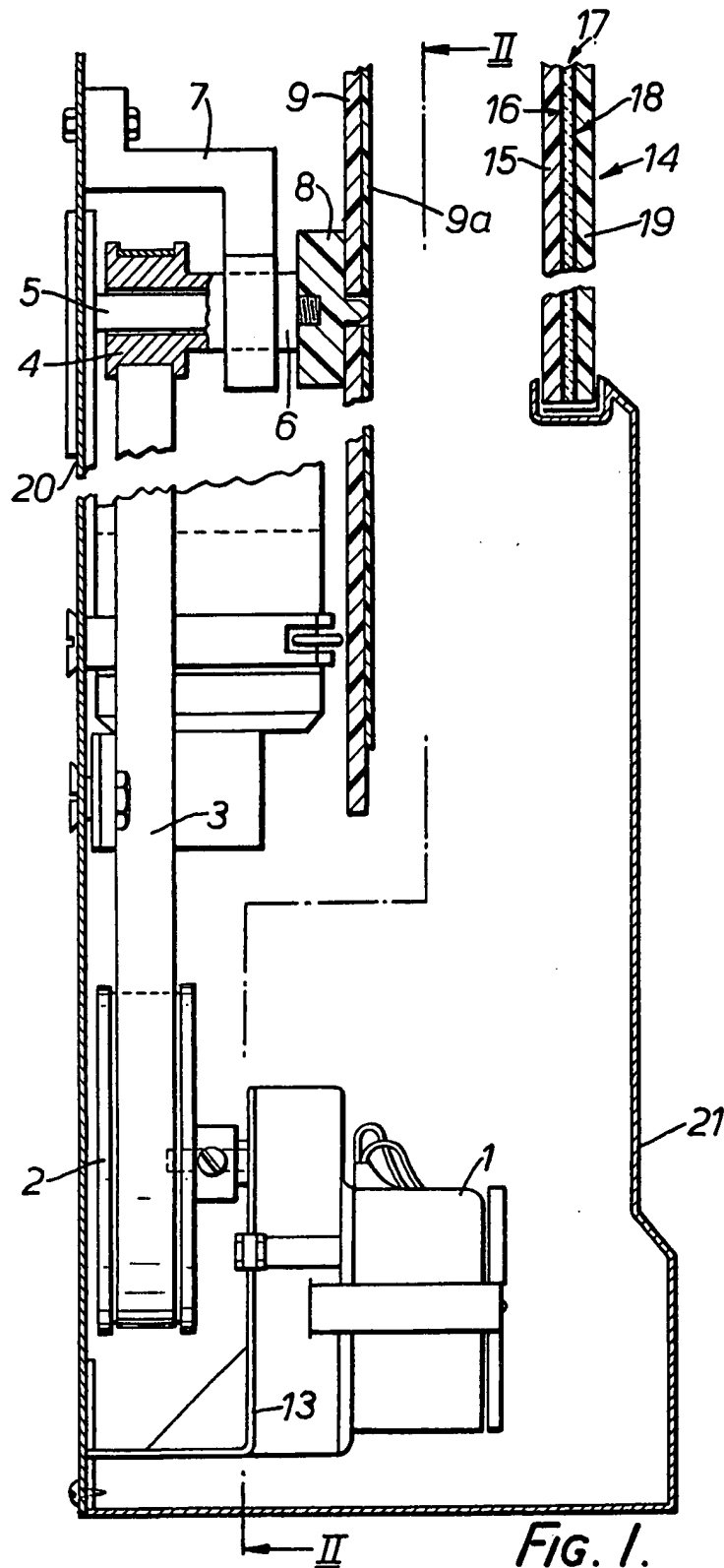
8. A luminous system of chromatic dynamics according to the previous claims, characterized in that with the purpose of adequately strengthening the structure of the screen and to prevent the occurrence of shadows, small intermediate columns or stanchions of transparent nature are installed in vertical arrangement.

9. A luminous system of chromatic dynamics according to the previous claims, characterized in that each of the discs can be driven by an independent motor, synchronized or not.

10. A luminous system of chromatic dynamics according to the previous claims, characterized in that all the discs can be driven by a single motor with appropriate transmission.

11. A luminous system of chromatic dynamics according to the previous claims, characterized in that the entire unit is encased in a suitable housing, provided with practical means for access to the interior, mounted on support pillars, thus forming a "DICRO" display screen the front of which is constituted by the birefringent screen containing the corresponding display effect.

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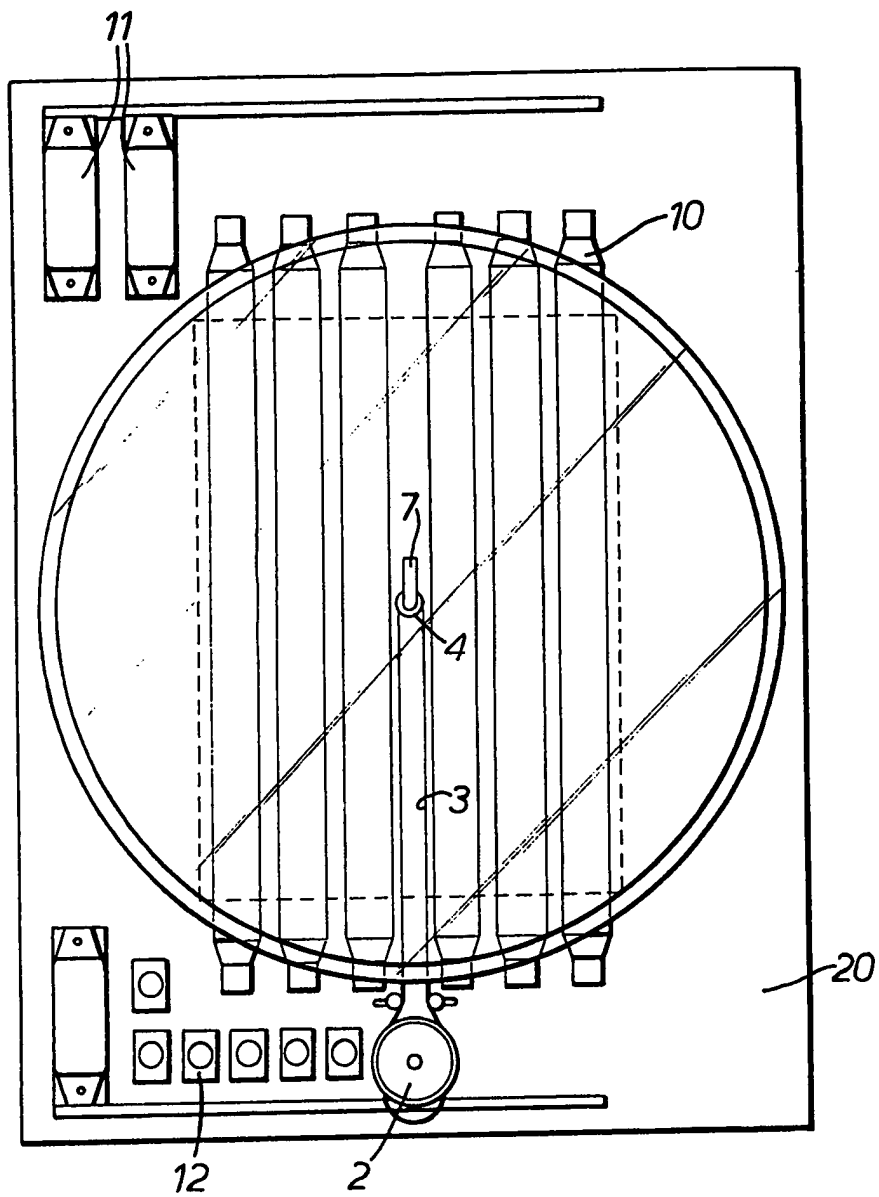


FIG. 2.

